



1 ENERGY AND ENVIRONMENT CABINET

2 Department for Environmental Protection

3 Division of Waste Management

4 (New Administrative Regulation)

5 401 KAR 48:207. Petroleum contaminated soil treatment facility liner geosynthetic quality
6 assurance and quality control.

7 RELATES TO: KRS Subchapters 224.01, 224.10, 224.40, 224.43, 224.99, 322.010(16)

8 STATUTORY AUTHORITY: KRS 224.10-100, 224.40-305

9 NECESSITY, FUNCTION, AND CONFORMITY: KRS 224.40-100(19)(c), (24) and (28)

10 requires the cabinet to adopt rules and administrative regulations for the permitting, management,
11 processing or disposal of wastes. KRS 224.40-305 requires that persons engaging in the
12 management, processing, and disposal of waste obtain a permit. This administrative regulation
13 establishes the biopile liner geosynthetic quality assurance and quality control testing requirements
14 for solid waste petroleum contaminated soil treatment facilities.

15 Section 1. Definitions. As used in this administrative regulation:

16 (1) "Certifying engineer" means the professional engineer that implements the petroleum
17 contaminated soil treatment facility construction quality assurance plan;

18 (2) "Petroleum contaminated soil" means silt, sand, clay, gravel, or other earthen
19 material; asphalt, concrete, or absorbent materials containing hydrocarbon concentrations above
20 the levels established in 401 KAR 48:205, Section 6, Table 2, but does not exhibit a hazardous
21 characteristic or is not a listed hazardous waste as defined in 401 KAR Chapter 31.

(3) "Petroleum contaminated soil treatment facility" means a solid waste site or facility where petroleum contaminated soil is treated to reduce contaminant concentrations to or below the levels established in 401 KAR 48:205, Section 6, Table 2.

(4) "Quality assurance" means the procedures that are initiated by the owner or operator and implemented by the professional engineer to ensure that the construction of the petroleum contaminated soil treatment facility meet design specifications and performance requirements; and

(5) "Quality control" means the system of control implemented by the manufacturer, fabricator, installer, construction contractor, operator or other person in order to meet construction specifications for the construction of the petroleum contaminated soil treatment facility.

Section 2. Applicability. (1) The quality assurance and quality control requirements of this administrative regulation apply to the construction of liner geosynthetics for biopiles at petroleum contaminated soil treatment facilities.

(2) The biopile liner design requirements are established in 401 KAR 48:205, Section 3 for petroleum contaminated soil treatment facilities.

Section 3. Specific Geosynthetic Clay Liner (GCL) Requirements for Bottom Liners. A Geosynthetic Clay Liner (GCL) is a low permeability man-made material having a maximum coefficient of permeability of 5×10^{-9} centimeters per second, and is used to control fluid migration.

(1) Materials required. (a) The GCL shall have a demonstrated hydraulic conductivity less than 5×10^{-9} centimeters per second.

(b) 1. Documentation shall be submitted to ensure chemical compatibility of the wastes with the GCL; or

2. In the absence of the appropriate documentation, chemical compatibility testing shall be performed using the current version of ASTM D6141 "Standard Guide for Screening Clay Portion of Geosynthetic Clay Liner (GCL) for Chemical Compatibility to Liquids"; or similar method based on the applicable standards of practice as established in KRS 322.010(16) for certification by a professional engineer.

(2)(a) Construction requirements. A GCL shall be installed in accordance with the requirements of the approved engineering plans, reports, and specifications in the petroleum contaminated soil treatment facility permit and manufacturer's recommendations.

(b) The certifying engineer shall ensure that the GCL installation, at a minimum, shall conform to the following: The GCL shall meet the manufacturer's and professional engineer's specifications based on the Geosynthetic Research Institute (GRI) GRI-GCL3, "Test Methods, Required Properties, and Testing Frequencies of Geosynthetic Clay Liners (GCLs)";

2. The GCL shall be installed on a biopile liner subgrade to promote positive drainage;

3. GCL installed on slopes shall be designed to withstand the calculated tensile forces acting upon the synthetic material and shall ensure that overall slope stability is maintained;

4. a. The surface of the supporting soil above which the GCL liner shall be installed shall be free of stones, organic matter, irregularities, protrusions, loose soil, and abrupt changes in grade that may damage the GCL; and

b. The supporting soil shall conform to the requirements established in 401 KAR 48:206, Section 5;

5. The anchor trench shall be excavated to the length and width prescribed on the approved design drawings in the permit;

1 6. a. Field seams shall be oriented parallel to the line of maximum slope, which is oriented
2 along, not across the slope.

3 b. In corners and irregularly-shaped locations, the number of field seams shall be
4 minimized;

5 7. The materials shall be overlapped using the appropriate method acceptable to the
6 manufacturer;

7 8. The seam area shall be free of moisture, dust, dirt, debris, and foreign material before
8 overlapping; and

9 9. Field seam overlapping shall be prohibited if the conditions including precipitation, and
10 wind do not meet the professional engineer's recommendations based upon the manufacturer's
11 specifications.

12 (3) Certification requirements. (a) The certifying engineer shall include in the form DEP
13 8064, Construction Progress Report for a Petroleum Contaminated Soil Treatment Facility, as
14 incorporated by reference in 401 KAR 47:205, Section 10, a discussion of the approved data
15 resulting from the quality assurance and quality control testing required in this subsection.

16 (b) The results of testing shall be included in the form DEP 8064, Construction Progress
17 Report for a Petroleum Contaminated Soil Treatment Facility, as incorporated by reference in
18 401 KAR 47:205, Section 10, including documentation of failed test results, descriptions of the
19 procedures used to correct the failed material, and statements of retesting performed.

20 (c) The certifying engineer shall certify, after review of the quality control testing of the
21 GCL, that the material meets the requirements of the approved engineering plans, reports, and
22 specifications in the petroleum contaminated soil treatment facility permit. Before installing a
23 GCL, the following information shall be available to the certifying engineer for approval:

- 1 1. Origin and identification of the raw materials used to manufacture the GCL;
- 2 2. Copies of quality control certificates issued by the producer of the raw materials used to
- 3 manufacture the GCL; and
- 4 3. a. Reports of tests conducted by the manufacturer to verify the quality of the raw
- 5 materials used to manufacture the GCL.
- 6 b. Tests shall be conducted for Bentonite Fluid Loss, Bentonite Mass per Area, Bentonite
- 7 Swell Index, Grab Strength, Hydrated Internal Shear Strength, Hydraulic Conductivity, Index Flux
- 8 and Peel Strength in accordance with GRI-GCL3 "Test Methods, Required Properties, and
- 9 Testing Frequencies of Geosynthetic Clay Liners (GCLs)", or other suitable tests based on the
- 10 applicable standards of practice as established in KRS 322.010(16) for certification by a
- 11 professional engineer.
- 12 (c) Quality assurance testing performed in the field under the supervision of the certifying
- 13 engineer shall assure conformity of the GCL installation with the engineering plans, reports, and
- 14 specifications submitted in accordance with the following requirements:
- 15 1. a. During the construction phase, the GCL shall be inspected for uniformity, damage,
- 16 and imperfections.
- 17 b. The GCL shall be inspected for tears, punctures, or holes; and
- 18 c. All imperfections shall be repaired and reinspected.
- 19 2. a. Tests conducted by the independent laboratory to verify the quality of the GCL
- 20 received at the facility.
- 21 b. Tests shall be conducted for Grab Tensile Strength, Swell Index, Peel Strength,
- 22 Bentonite Mass per Area in accordance with GRI-GCL3 "Test Methods, Required Properties, and
- 23 Testing Frequencies of Geosynthetic Clay Liners (GCLs)", or other appropriate test methods

1 based on the applicable standards of practice as established in KRS 322.010(16) for certification by
2 a professional engineer.

3 Section 4. Specific Synthetic Liner Requirements for Bottom Liners. A biopile synthetic
4 liner shall comply with the requirements of 401 KAR 48:205, Section 3 and meet the following
5 requirements:

6 (1) Materials required. (a) The synthetic liner material shall have a chemical and physical
7 resistance not adversely affected by waste placement or leachate generated.

8 (b) 1. Documentation shall be submitted to ensure chemical compatibility of the synthetic
9 liner material chosen; or

10 2. In the absence of the appropriate documentation, chemical compatibility testing shall be
11 performed using EPA SW-846 test method 9090A, "Compatibility Test for Wastes and Membrane
12 Liners" incorporated by reference in 401 KAR 48:205, Section 9; and

13 (2) Construction requirements. (a) Biopile synthetic liners shall be installed in accordance
14 with the requirements of the approved engineering plans, report, and specifications in the
15 petroleum contaminated soil treatment facility permit and manufacturer's recommendations.

16 (b) The certifying engineer shall ensure that the biopile synthetic liner installation, at a
17 minimum, shall conform to the following:

18 1. The biopile synthetic liner shall have a nominal thickness of sixty (60) mils for liners;

19 2. The biopile synthetic liner shall be installed on a liner subgrade that promotes positive
20 drainage;

21 3. The biopile synthetic liner installed on slopes shall be designed to withstand the
22 calculated tensile forces acting upon the synthetic material and shall ensure that overall slope
23 stability is maintained;

1 4. The surface of the supporting soil above which the biopile synthetic liner shall be
2 installed shall be free of stones, organic matter, irregularities, protrusions, loose soil, and abrupt
3 changes in grade that may damage the biopile synthetic liner;

4 5. The anchor trench shall be excavated to the length and width prescribed on the approved
5 design drawings in the petroleum contaminated soil treatment facility permit;

6 6. Field seams shall be oriented parallel to the line of maximum slope, which is, oriented
7 along, not across the slope. In corners and irregularly-shaped locations, the number of field seams
8 shall be minimized;

9 7. The materials shall be seamed using the appropriate method in the permit. Seam testing
10 shall be performed in accordance with the requirements of Section 5 of this administrative
11 regulation;

12 8. The seam area shall be free of moisture, dust, dirt, debris, and foreign material before
13 seaming; and

14 9. Field seaming shall be prohibited if the conditions including ambient air, temperature,
15 precipitation, and wind do not meet the professional engineer's recommendations based upon the
16 manufacturer's specifications.

17 Section 5. Synthetic Liner Certification Requirements for Bottom Liners. (1) The certifying
18 engineer shall include in the form DEP 8064, Construction Progress Report for a Petroleum
19 Contaminated Soil Treatment Facility, as incorporated by reference in 401 KAR 47:205, Section
20 10, a discussion of the reviewed data resulting from the quality assurance and quality control
21 testing required in this section.

22 (2) The results of all testing shall be included in the form DEP 8064, Construction Progress
23 Report for a Petroleum Contaminated Soil Treatment Facility, as incorporated by reference in

1 401 KAR 47:205, Section 10, including documentation of failed test results, descriptions of the
2 procedures used to repair the failed material, and documentation of retesting performed.

3 (3) The certifying engineer shall certify, after review of the quality control testing of the
4 biopile synthetic liner, if the material meets the requirements of the approved engineering plans,
5 reports, and specifications in the permit.

6 (4) Before installing a biopile synthetic liner, the following information shall be available
7 to the certifying engineer for approval:

8 (a) Origin and identification of the raw materials used to manufacture the biopile synthetic
9 liner;

10 (b) Copies of quality control certificates issued by the producer of the raw materials used to
11 manufacture the biopile synthetic liner; and

12 (c) Reports of the following tests conducted to verify the quality of the raw materials used
13 to manufacture the biopile synthetic liner: tests for specific gravity, melt flow index, and percent
14 carbon black shall be performed using GRI Test Method GM13, "Test Methods, Test Properties
15 and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured
16 Geomembranes".

17 (5) The certifying engineer shall verify through appropriate documentation that the quality
18 control testing of the synthetic liner at the factory took place in accordance with the manufacturer's
19 quality control plan, which is based on the appropriate GRI specifications based on the applicable
20 standards of practice as established in KRS 322.010(16) for certification by a professional
21 engineer.

(6) Quality assurance testing performed in the field under the supervision of the certifying engineer shall assure conformity of the biopile synthetic liner installation with the engineering plans, reports, and specifications submitted in accordance with the following requirements:

(a) During the construction phase, the biopile synthetic liner shall be inspected for uniformity, damage, and imperfections using the following procedures:

1. The biopile synthetic liner shall be inspected for tears, punctures, or blisters; and
2. All imperfections shall be repaired and reinspected;

(b) All field seams shall be nondestructively tested over their entire length using the air pressure test for double fusion seams or the vacuum test for other seams using the following procedures:

1. The certifying engineer shall be responsible for overseeing the accomplishment of nondestructive testing;

2. The contractor or test personnel shall do the following:

- a. Record the location, date, test unit number, name of tester, and results of testing;
- b. Inform the installer of required repairs; and
- c. (i) Overlay seams that cannot be nondestructively tested with the same biopile synthetic liner; and

(ii) The seaming and patching operation shall be inspected by the certifying engineer for uniformity and completeness;

(c)1. Destructive testing shall be performed on the synthetic liner seam sections using GRI Test Method GM19, "Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes".

2. Seam samples for testing shall be taken as follows:

1 a. A minimum of one (1) test per every 500 feet of seam length unless a more frequent
2 testing protocol is agreed upon by the installer and professional engineer; and

3 b. Additional test locations may be determined during seaming based on the applicable
4 standards of practice as established in KRS 322.010(16) for certification by a professional
5 engineer.

6 3. Test locations shall be documented in the following manner:

7 a. The certifying engineer shall approve the sample size to be taken;

8 b. The sample size shall be predetermined as being large enough to perform the required
9 testing; and

10 c. An independent laboratory shall perform the required testing that shall include, as a
11 minimum, testing for seam strength and peel adhesion using GRI Test Method GM19 "Seam
12 Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes".

13 4. If a sample fails destructive testing, the certifying engineer shall ensure that:

14 a. The seam shall be reconstructed between the location of the sample that failed and the
15 location of the next acceptable sample; or

16 b. The welding path shall be retraced to an intermediate location at least ten (10) feet from
17 the location of the sample that failed the test, and new samples shall be taken for additional field
18 tests; and

19 c. (i) If both new samples pass testing, the seam shall then be reconstructed between the
20 location of both new samples; and

21 (ii) If a new sample fails, the process in this subparagraph shall be repeated.

22 Section 6. Incorporation by Reference. (1) The following material is incorporated by
23 reference:

1 (a) “ASTM D6141 Standard Guide for Screening Clay Portion of Geosynthetic Clay Liner
2 (GCL) for Chemical Compatibility to Liquids”;

3 (b) GRI-GCL3 “Test Methods, Required Properties, and Testing Frequencies of
4 Geosynthetic Clay Liners (GCLs)”;

5 (d) GRI Test Method GM13 “Test Methods, Test Properties and Testing Frequency for
6 High Density Polyethylene (HDPE) Smooth and Textured Geomembranes for HDPE”; and

7 (e) GRI Test Method GM19 “Seam Strength and Related Properties of Thermally Bonded
8 Polyolefin Geomembranes”;

9 (2) This material may be inspected, copied, or obtained, subject to applicable copyright
10 law, at the Division of Waste Management, 200 Fair Oaks Lane, Second Floor, Frankfort,
11 Kentucky 40601, Monday through Friday, 8 a.m. to 4:30 p.m.

12 (3) This material may also be obtained from the following organizations:

13 (a) The material in subsection (1)(a) may be obtained at:

14 1. ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA,
15 19428-2959 USA; or

16 2. <http://www.astm.org/index.shtml>;

17 (b) The material in subsection (1)(c) through (f) may be obtained at:

18 1. Geosynthetic Research Institute, 475 Kedron Avenue, Folsom, PA 19033-1208 USA;

19 or

20 2. <http://www.geosynthetic-institute.org/>

401 KAR 48:207 approved for filing.

Date

4/14/11



Leonard K. Peters, Secretary
Energy and Environment Cabinet

PUBLIC HEARING AND PUBLIC COMMENT PERIOD: A public hearing on this administrative regulation shall be held on May 23, 2011 at 10:00 A.M. (Eastern Time) at 300 Fair Oaks, Frankfort, KY 40601. Individuals interested in being heard at this hearing shall notify this agency in writing by May 16, 2011, five workdays prior to the hearing, of their intent to attend. If no notification of intent to attend the hearing is received by that date, the hearing may be cancelled. This hearing is open to the public. Any person who wishes to be heard will be given an opportunity to comment on the proposed administrative regulation. A transcript of the public hearing will not be made unless a written request for a transcript is made. If you do not wish to be heard at the public hearing, you may submit written comments on the proposed administrative regulation. Written comments shall be accepted until May 31, 2011. Send written notification of intent to be heard at the public hearing or written comments on the proposed administrative regulation to the contact person.

CONTACT PERSON: Kelli Reynolds
Division of Waste Management
200 Fair Oaks, Second Floor
Frankfort, KY 40601
Telephone: (502) 564-6716 Fax (502) 564-4049
Email: Kelli.Reynolds@ky.gov

REGULATORY IMPACT ANALYSIS AND TIERING STATEMENT

Contact Person: Kelli Reynolds

(1) Provide a brief summary of:

(a) What this administrative regulation does:

This administrative regulation establishes the liner geosynthetic quality assurance and quality control testing requirements for solid waste petroleum contaminated soil treatment facilities.

(b) The necessity of this administrative regulation:

This administrative regulation is necessary to establish the requirements for the liner geosynthetic quality assurance and quality control testing requirements for solid waste petroleum contaminated soil treatment facilities.

(c) How this administrative regulation conforms to the content of the authorizing statutes:

This administrative regulation conforms to the content of the authorizing statutes by establishing the liner geosynthetic quality assurance and quality control testing requirements for solid waste petroleum contaminated soil treatment facilities, which are types of solid waste sites or facilities.

(d) How this administrative regulation currently assists or will assist in the effective administration of the statutes:

This administrative regulation will assist in the effective administration of the statutes by establishing requirements for the liner geosynthetic quality assurance and quality control testing requirements for solid waste petroleum contaminated soil treatment facilities.

(2) If this is an amendment to an existing administrative regulation, provide a brief summary of:

(a) How the amendment will change this existing administrative regulation: NA

(b) The necessity of the amendment to this administrative regulation: NA

(c) How the amendment conforms to the content of the authorizing statutes: NA

(d) How the amendment will assist in the effective administration of the statutes: NA

(3) List the type and number of individuals, businesses, organizations, or state and local governments affected by this administrative regulation:

Businesses that treat petroleum contaminated soils will be affected by this administrative regulation. There are currently 3 permitted by the Solid Waste Branch.

(4) Provide an analysis of how the entities identified in question (3) will be impacted by either the implementation of this administrative regulation, if new, or by the change, if it is an amendment, including:

(a) List the actions that each of the regulated entities identified in question (3) will have to take to comply with this administrative regulation or amendment:

Regulated entities will have to comply with the requirements liner geosynthetic quality assurance and quality control testing requirements for solid waste petroleum contaminated soil treatment facilities. This regulation includes the specific liner design requirements and liner certification requirements for petroleum contaminated soil treatment facilities.

(b) In complying with this administrative regulation or amendment, how much will it cost each of the entities identified in question (3):

The cost to implement this type of permit for an existing facility would be approximately \$175,000 per acre for the plastic liner and the storage building will be dependent on the size of the building. Groundwater monitoring will not be an additional cost since the existing facilities have monitoring wells already installed.

(c) As a result of compliance, what benefits will accrue to the entities identified in question (3):

With the regulated entities being compliant with this administration regulation they will be staying in compliance with their issued permit.

(5) Provide an estimate of how much it will cost the administrative body to implement this administrative regulation:

(a) Initially: None

(b) On a continuing basis: None

(6) What is the source of the funding to be used for the implementation and enforcement of this administrative regulation:

This regulation will be implemented and enforced using the solid waste permit fees collected pursuant to 401 KAR 47:090 and general funds.

(7) Provide an assessment of whether an increase in fees or funding will be necessary to implement this administrative regulation, if new, or by the change if it is an amendment:

There will be no increase of fees and no additional funding is necessary to implement this regulation.

(8) State whether or not this administrative regulation established any fees or directly or indirectly increased any fees:

This administrative regulation does not establish any fees.

(9) TIERING: Is tiering applied? (Explain why or why not)

Tiering is not applied. The requirements for liner geosynthetic quality assurance and quality control testing requirements for all solid waste petroleum contaminated soil treatment facilities.

FISCAL NOTE ON STATE OR LOCAL GOVERNMENT

Regulation No. 401 KAR 48:207

Contact Person: Kelli Reynolds

1. Does this administrative regulation relate to any program, service, or requirements of a state or local government (including cities, counties, fire departments, or school districts)?

Yes X No

If yes, complete questions 2-4.

2. What units, parts or divisions of state or local government (including cities, counties, fire departments, or school districts) will be impacted by this administrative regulation?

Kentucky Division of Waste Management

3. Identify each state or federal statute or federal regulation that requires or authorizes the action taken by the administrative regulation.

KRS 224.10-100 and 224.40-305

4. Estimate the effect of this administrative regulation on the expenditures and revenues of a state or local government agency (including cities, counties, fire departments, or school districts) for the first full year the administrative regulation is to be in effect.

(a) How much revenue will this administrative regulation generate for the state or local government (including cities, counties, fire departments, or school districts) for the first year?

None.

(b) How much revenue will this administrative regulation generate for the state or local government (including cities, counties, fire departments, or school districts) for subsequent years?

None.

(c) How much will it cost to administer this program for the first year?

No additional cost to the Division of Waste Management.

(d) How much will it cost to administer this program for subsequent years?

No additional cost to the Division of Waste Management.

Note: If specific dollar estimates cannot be determined, provide a brief narrative to explain the fiscal impact of the administrative regulation.

Revenues (+/-):

Expenditures (+/-):

Other Explanation:

Detailed Summary of Material Incorporated by Reference

I. This administrative regulation incorporates by reference the “ASTM D6141 Standard Guide for Screening Clay Portion of Geosynthetic Clay Liner (GCL) for Chemical Compatibility to Liquids”. This document covers procedures and test methods that can be used in the evaluation of the ability of the clay portion of a geosynthetic clay liner to resist change due to exposure to liquids.

This document consists of 3 pages.

II. This administrative regulation incorporates by reference the GRI-GCL3 “Test Methods, Required Properties, and Testing Frequencies of Geosynthetic Clay Liners (GCLs)”; This document specifications cover the manufacturing quality control of geosynthetic clay liners, describing types of tests, the proper test methods, minimum and sometimes maximum values, and the minimum testing frequencies.

This document consists of 12 pages.

IV. This administrative regulation incorporates by reference the GRI Test Method GM13 “Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes for HDPE”; This document specification covers high density polyethylene geomembranes for both smooth and textured surfaces and sets forth a set of minimum, physical, mechanical, and chemical properties that must be met, or exceeded by the geomembrane being manufactured.

This document consists of 12 pages.

V. This administrative regulation incorporates by reference the GRI Test Method GM19 “Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes”; This document addresses the required seam strength and related properties of thermally bonded polyolefin geomembranes; in particular, high density polyethylene, linear low density polyethylene and flexible polypropylene both nonreinforced and scrim reinforced.

This document consists of 12 pages.